



Distr.
LIMITED

ID/WG.417/7
24 February 1984
ENGLISH

United Nations Industrial Development Organization

Expert Group Meeting on Exchange of
Experiences on Energy Conservation
in Small and Medium Industries for
ASEAN Countries

Kuala Lumpur, Malaysia, 5-7 December 1983

ENERGY CONSERVATION IN THE PHILIPPINES^{*}

by

Gregorio Gonzales^{**}
and
Marilou Calzado^{***}

* This document has been reproduced without formal editing.

** President, Energy Management Association of The Philippines, Escolta Manila.

*** Manager, Energy Productivity Division, Productivity and Development Centre,
Development Academy of The Philippines, Cubao. Q.C., The Philippines.

1.0 BACKGROUND: The Small and Medium Scale Industry in the Philippines

Small and medium scale industries (SMI) play a vital role in the development of the Philippine economy. SMI accounts for more than 90% of the total number of establishments in the manufacturing sector employing some 50% of workers.

In order to place a stronger emphasis on the SMI, a government bureau^{1/} was instituted to respond to the needs of the sector and face the challenges of the 80's.

The small and medium industry in the Philippines is defined according to the following criteria:

1. Based on asset size for lending purposes: Small scale industries are those with total assets between ₱250,000 and ₱2.5 M. Medium scale industries are those whose total assets are not exceeding ₱10 M. The government based these criteria on assets before financing and provides for adjustments for changes in the country's economic conditions.
2. Based on number of employees for statistical purposes: Small scale industries employ from 10-99 workers while medium scale industries employ from 100-199 workers.
3. Based on management structure: Small and medium scale industries are enterprises in which the owner-manager performs the varied range of tasks involved in guidance and leadership without the help of specialized staff officers.

^{1/} Bureau of Small and Medium Industries (BSMI) under the Ministry of Trade and Industry (MTI).

Based on the foregoing, the objectives of the Small and Medium Industries were formulated in line with the government's National Development Plan. These are:

- a. equitable distribution of wealth,
- b. increased employment generation,
- c. improved living standards of the poor,
- d. countryside development, and
- e. utilization of indigenous resources.

The government's national industrialization objectives provided the framework for small and medium scale industries development. Among others, this framework covers the following thrusts:

- a. accelerated employment creation.
- b. increased foreign exchange earnings to support the country's development programs and growing import bills,
- c. a dynamic industrial structure that is efficient and world competitive, and
- d. an even distribution of benefits of industrialization among the Filipino people.

These objectives and framework are in line with the Philippine government industry-intensive plan.

1.1 Financial Assistance

To assist the Small and Medium Scale Industries to acquire substantial working capital, the government devised policies to facilitate financial extension to these industries. These policies are the following:

1. Long term lending policies extended to SMI through financial institutions (notably the Development Bank of the Philippines (DBP)),
2. Interest rates for loan extended to SMI reflects the cost of borrowing and is in line with the prevailing market rates,

3. Easing up government policies on collateral requirement for SMI borrowers through provision of guarantee schemes.
4. Schemes covering equipment leasing to reduce the needs of SMI to invest in fixed assets,
5. Equity financing by private sector, and
6. Additional financing schemes for working capital, e.g., sub-contracting financing of purchase orders and in-kind raw material financing.

2.0 Energy Conservation Program in SMI's

At this point, we would like to share some of the Energy Conservation Programs for the Small and Medium Scale Industries. Examples from industrial sectors are presented to give you a first-hand look at our developmental efforts towards energy conservation. These examples were actually presented during the National Energy Conservation Workshop held last September 1983 and it is with due respect that we in turn present these to our ASEAN brothers who may get something out of these examples.

Before we proceed with these examples it is but proper that we also look into the Philippine Energy Situation in the 80's.

2.1 The Philippine Energy Situation

The severe oil crisis of 1973 made it necessary that our government devise ways and means to counter/minimize the impact of the energy problem. Steps were undertaken by our government to include the exploitation and development of indigenous and alternative energy sources and the management of energy demand and supply. The programs have been highly successful considering that energy dependency from outside sources have drastically been reduced by a third. By the end of 1982, local energy sources accounted for 31.7% of total requirements, a hefty increase from 1978's 12.8%. Refer to Table 1.

TABLE 1
Primary Energy Consumption
(Thousand Barrels of Fuel Oil Equivalent)

	<u>1982</u>	<u>1981</u>	<u>1980</u>	<u>1979</u>	<u>1978</u>
Imported Energy					
Oil	65533	67162	69455	70504	75322
Indigenous Energy					
Oil	2952	1373	3507	7177	-
Coal	1110	905	955	815	929
Hydro	6653	6384	5938	4798	4645
Geothermal	6245	4747	3501	1064	5
Bagasse	7352	6224	4850	5308	5449
Non-conventional	78	340	21	-	-
Agri-Industrial	6090	6260	-	-	-
Sub-total	30480	26233	18722	19162	11028
% of Total	31.7	28.1	21.3	21.4	12.8
Total Consumption	960313	93395	88227	89666	86372

Source: Ministry of Energy Report for 1982, p.44.

The substitution of imported energy by local sources resulted in savings of P918 million for 1982 alone, and this accounted for the drop in the oil bill by 16% from the previous year. The sustained pace in domestic oil production generated an average of over 21,000 barrels per day, roughly 10% of total daily requirements for 1982. This was achieved despite the decline in exploration activities which saw only 12 exploratory wells drilled. The accompanying discovery of four gas deposits boosted further the gains made in oil production which amounted to 3.56 million barrels.

Coal production for 1982 was 556,900 metric tons, a 55% improvement from the 1981 production of 359,000 metric tons. As in previous years, the actual production capacity of existing mines (estimated at 800,000 MT) was not optimized on purpose due to the oversupply situation. This year, an upsurge in demand is anticipated when the level of utilization increases with the conversion of mining and cement industries to coal usage. The rest of the local energy sources registered modest gains, except for non-conventional sources and from agri-industrial waste fuel.

In the transport sector, the use of energy, particularly petroleum products, had been kept below 10 per cent of total consumption. Within the industry, the share of land transport had grown from only 29.3% in 1979 to a staggering 44.7% during the first quarter of 1983. Domestic marines's share fell from a high of 45.8% in 1980 to just 39% during the first quarter of 1983. The share of domestic aviation also registered a drop from 20% in 1980 to only 16.3% for the same quarter (see Table 2). Other major petroleum users are Power Generation, Mining, Cement, Logging/Wood Production, and Contractors which account for more than 60% of total consumption.

TABLE 2

Petroleum Products Consumption in the
Transport Sector
(In Thousand Barrels)

	1983 [*]	1982	1981	1980	1979
Land Transportation	515.32	1959.44	1643.00	1548.00	1582.40
% of total	44.7	42.5	38.6	34.2	29.3
Domestic Marine	449.28	1872.02	1817.00	2076.00	2171.30
% of total	39.0	40.6	42.6	46.8	40.3
Domestic Aviation	188.40	777.67	801.00	907.00	1638.80
% of total	16.3	16.9	18.8	20.0	30.4
Total	1153.0	4609.13	4261.00	4531.00	5392.50

* First Quarter

Source: Quarterly Review, Bureau of Energy Utilization.

Although the transportation industry's share of petroleum use still has to surpass the 10% mark, the fact that it belongs to the top five major users of fuel is more than enough reason to conserve petroleum utilization within the industry. In fact, according to Asian Energy Problems (An Asian Development Bank Survey, p. 223), a large part of the reduction in energy consumption was primarily the result, among others, of better fleet management and reduction in leisure travel in the transport sector. With such premise, the Philippines has introduced energy conservation measures and programs to develop potential local sources of energy within the sector, among which are:

1. Prohibition in the importation, manufacture or assembling of gasoline-powered passenger motor cars with engine displacement of over 2,800 cc. or kerbweight exceeding 1,500 kilograms, including accessories.
2. Ban in the use of government vehicles during Sundays, legal holidays, or outside of office hours or authorized routes.

3. Granting of authority to the Ministry of Transportation to regulate the use of motor vehicles for purpose of conserving fuel. Regulations may include restrictions in the use of vehicles during certain days and time, destinations or streets, and even denying registration to certain types of vehicles which do not meet standards of energy consumption.
4. Empowering the Ministry of Energy to allocate and distribute fuel to various sectors of the economy whenever necessary for the general welfare.

Aside from these provisions, the government also introduced measures designed to encourage fuel conservation. One was the support extended to the manufacture and use of vehicles running on diesel engines as against gasoline-powered engines. To complement this move, the socialized pricing scheme was adopted wherein diesel fuel prices were lowered thru imposition of lower tax rates. This resulted in the mass usage of diesel-fueled vehicles by the public transportation sector as diesel prices accounted for only 62.71% of premium gasoline. The use of compact cars was also encouraged due to their better fuel efficiency capability.

A study is currently being done by the Bureau of Energy Utilization on the efficiency trade-offs between gasoline and diesel for the purpose of establishing a better petroleum pricing policy.

In the public land transportation side, the government came up with the following:

1. Segregated Bus Stops - Both as an energy conservation and traffic decongestion measure, the system segregates loading/unloading points for passenger buses, along E. de los Santos Avenue, the longest and busiest road in Metro Manila.

2. Banning of less efficient public transportation vehicles in certain routes - This is presently being applied along E. de los Santos Avenue where passenger density is greatest.
3. Establishment of the Light Rail Transit System - under construction at present - this project is expected to transport thousands of commuters along one of Manila's busiest routes at the least fuel utilization.
4. Synchronization of traffic warning devices. This move greatly contributed to fuel conservation as it enabled vehicles to move along simultaneously at both sides of the road.

Case 1. The Metro Manila Transit Corporation (MMTC)

In Metro Manila Transit Corporation (MMTC), a government controlled bus company, energy conservation is a multi-pronged activity. MMTC operates about 500 units daily, distributed on more than 20 different routes. With such a large fleet, energy conservation is a challenge. The quest for energy efficiency is treated not only as a cost control program but as an eventual model for private industry to copy and improve upon.

Current programs presently being undertaken are:

1. Tachograph utilization - The permanent records provided by tachographs allow management greater control over operating costs, driver performances, maintenance scheduling, equipment utilization, and safety standards. Through tachographs, we were able to correct bad drivers' habits on speeding and engine operating ranges, and institute fairly accurate maintenance schedules.

2. Better Maintenance Activity - This required the realignment of maintenance functions to include energy efficiency goals. Activities under this measure include monitoring of less fuel-efficient units and correction through engine derating, scaling down of horsepower capacity or repowering of older engines and daily monitoring of fuel deliveries, handling methods and fuel issuance to avoid minimize losses and wastage.
3. Better Dispatching Methods - This measure involves the redistribution of bus trips to conform to passenger availability patterns, resulting in better revenue-generating opportunities and generation of fuel savings thru elimination of unproductive runs.
4. Training and Education of Personnel - This is the most visible and active company project which entails several seminars held on regular intervals. Aside from the usual pre-employment lectures and training programs, drivers undergo lectures and seminars on correct bus operating techniques and maintenance, including the effective use of bus equipment. This program serves as the tool for increasing drivers' awareness of energy conservation and fuel efficiency.
5. Use of rewards - A rigid gathering of essential data from the transport crews, engineering personnel, and fuel issuers are performed daily, dissected, and statistically analyzed to expose the fuel savers and fuel wasters. In this regard, the top fuel savers are not only commended and recognized at appropriate ceremonies but also given a percentage of actual fuel savings. Conversely, the worst fuel wasters are given strict reminders of their undesirable driving habits, made to undergo the re-training cycle and are forewarned of future management action if no significant improvement will be observed in succeeding months.

Reports from this process also reveal significant indications on bus performance and maintenance procedures, and thereby trigger appropriate management action.

The company's transport operations has a variety of bus services which is a remarkable feature in the industry. In addition to the Ordinary mode, the Express and Aircon Services cater to the long distance commuters who prefer faster and more convenient modes. The Aircon particularly helps reduce the utilization of privately owned vehicles, a greater number of which are also air conditioned. The Double Deckers, on the other hand, provide space and fuel savings, as well as fare reduction on a per passenger basis.

The drive towards a fuel efficient public transport system does not end there. The government has adopted support programs for the industry in order to motivate the sector to use alternative forms of fuel which are locally available. The introduction of gasifiers among jeepney operators was recently strengthened by the development of a lighter model. To speed up the distribution of the gasifier, which convert biomass (any agricultural and forest waste product) into combustible gases used for heating and power, a financial scheme was formulated to assist transport cooperatives and independent operators to acquire them at easy terms. To support the gasifier program, 1.5 million hectares of land was declared alienable and disposable by the President to be used in the production of fast growing trees, particularly ipil-ipil, which are made into charcoal, the gasifier's fuel.

Alcogas use, meanwhile, is being boosted by providing financial and tax incentives to sugar mills that produce anhydrous alcohol for blending with gasoline. Incentives include subsidies on prices of anhydrous alcohol output to make them competitive with current sources of energy. The Ministry of Energy, as part of its

function to require the use of alcohol gasoline mix or other energy blends, has caused the manufacture of coco-diesel, a mixture of coconut oil and diesel. Coco-diesel is of great potential due to the abundance of coconut in the country. Encouragements provided by the government are production and technical assistance to the coconut industry as well as price support to end-product prices.

Case 2. Solid Mills, Inc.

In 1979, Solid Mills, Inc. (SMI) undertook energy conservation measures for BFO. These measures were basically housekeeping which were undertaken without much capital cost.

SMI adopted the ratio of BFO to production which showed that in 1979, the ratio of 1 liter of BFO to 1 kilogram of production was 0.2585. By 1980, the ratio went down to 0.2103 with a 1981 target aimed at a modest ratio of 0.1516.

SMI started monitoring its electric consumption for which the accepted basis is the ratio KWH/KG of production. In 1980, the ratio took its highest increase, 12%. This high incremental ratio was largely due to the modernization of the whole plant in 1978. However, this proved encouraging for the firm because product quality and productivity at the factory level increased by more than 20% and 40% respectively enough to cover the electric consumption ratios. Similar operating strategies such as power factor improvement, optimizing lighting requirements, etc. were resorted to.

A major turn of events to highlight the energy conservation measures of Solid Mills, Inc. was the installation of the By-Product-Power Plant or the Co-generation System. Plainly, co-generation is the simultaneous production of the steam and electricity similar to that of a utility power plant except that the exhaust from the turbine is further utilized for other processes.

The co-generation plant has a boiler capacity of 16 tons/hr. that runs a turbine/generator with a rated output of 1.6 megawatts. The exhaust steam is extracted from the turbine at 85 psi (pounds per square inch) and is used for Dyeing and Finishing processes. Consequently, the old boilers are on standby when the co-generation plant is running. The boiler of the co-generation plant is guaranteed to have an efficiency of 92% much better than the old boilers with an efficiency of 85%. Further, the 1.6 megawatts generated by the co-generation plant have chopped off some 30% on electric bills of Solid Mills, Inc.

One of the most successful programs undertaken in the field of energy management is the education program. As of November 1983, there are 1871 energy managers and energy technicians trained on energy management. Graduates include top company officials, plant managers and supervisors. Lately, an energy management course was also conducted for the engineering academe of ten universities. Presently, a one-semester course on energy management for graduating engineering students is being pilot-tested. The course is being endorsed by the Ministry of Education, Culture and Sports (MECS) where due accreditation will be given to participating students from 10 universities.

This endeavor is jointly undertaken by the Bureau of Energy Utilization and the Productivity and Development Center of the Development Academy of the Philippines since 1979.

3.0 Energy Audits in Key Energy-Intensive SMI

Assistance in the conduct of energy audits is being extended by the Bureau of Energy Utilization (BEU), to assist industrial, transport, commercial and building establishments to identify energy conservation opportunities. In line with this program the BEU has conducted since July 1982 up to April 1983, energy audits of 69 selected industrial plants which included among others 4 cement plants, 7 mining companies, 5 textile companies and 4 steel/metal corporations. Many of these companies are of course large industries. A number of them fall under the SMI category.

The energy audits have enabled the BEU and the companies to determine energy utilization efficiency of the various energy consuming facilities and processes, and identify potential areas for energy conservation. The BEU, in the conduct of energy audits of the 69 industrial plants, took note of the energy savings on company implemented energy conservation measures (see Table 3) and in return, provided the companies with potential energy savings based on BEU recommended energy conservation measures (see Table 4).

The following energy conservation measures were implemented by the companies belonging in mining, textile and steel/metal processing sectors:

Mining Sector

1. Power factor improvement by use of capacitors
2. Oil Reclamation
3. Preheating of boiler feedwater using calcine cooler
4. Installation of a new 30 MW Sulzer Diesel-Generator set
5. Improvement in electric power utilization
6. Burning of carbon gases in lieu of LPG in sintering furnace
7. Use of condensate heat in ammonia scrubber
8. Optimizing steam to carbon ratio in the gas plant
9. Reduction of sulphides moisture by use of filters before drying.

Textile Sector

1. Power factor improvement by use of capacitors
2. Fuel consumption monitoring and housekeeping measures
3. Cogeneration power system
4. Installed economizer on boiler
5. Continuous degumming equipment
6. Condensate and flash steam recovery system
7. Daily check of leaks, insulation and steam traps
8. Reduction in lighting

Table 3 Energy Savings on Company Implemented
Energy Conservation Measures

Industrial Sector	No. of Companies Audited	Combined		Annual Energy Savings		Reported		Range of Savings %
		Annual Energy Consumption KJ Million	Million LOE/2	Combined Savings Million KJ	Million LOE	Combined Savings %		
1. Cement	4	10,245,899	245.12	-	-	-	-	-
2. Ceramics	4	496,227	11.87	1,834	0.04	0.4	2.8	2.8
3. Chemicals	4	3,854,633	92.22	48,390	1.16	1.2	1.4 - 5.3	1.4 - 5.3
4. Coconut/Veg. Oil	6	2,266,011	54.21	33,321	0.80	1.5	2.1 - 4.4	2.1 - 4.4
5. Construction	2	221,390	5.30	8,561	0.20	3.7	3.0 - 13.5	3.0 - 13.5
6. Food	7	2,016,628	48.24	122,256	2.92	4.7	2.7 - 11.3	2.7 - 11.3
7. Glass	3	1,705,120	40.79	730,800	17.48	30.0	5.1 - 53.6	5.1 - 53.6
8. Mining	7	48,032,545	1149.10	1,200,003	28.71	2.4	3.2 - 4.4	3.2 - 4.4
9. Petroleum	2	12,908,589	308.82	1,293,740	30.95	9.1	5.3 - 17.7	5.3 - 17.7
10. Pulp & Paper	3	13,196,861	315.71	305,653	7.31	2.3	2.0 - 7.7	2.0 - 7.7
11. Rubber	3	756,664	18.10	-	-	-	-	-
12. Steel/Metal	5	10,162,843	243.13	433,346	10.37	4.7	4.0 - 6.7	4.0 - 6.7
13. Sugar	4	5,198,653	124.37	446,703	10.69	8.5	13.5	13.5
14. Textile	5	1,889,580	45.21	66,669	1.60	3.4	2.1 - 14.4	2.1 - 14.4
15. Wood	2	1,113,829	26.65	62,496	1.50	5.3	10.6	10.6
16. Tobacco	1	70,547	1.69	-	-	-	-	-
17. Others 1/	2	123,149	2.95	-	-	-	-	-
18. Power Plants	5	93,245,902	2230.76	-	-	-	-	-
TOTAL	59	207,505,070	4964.24	4,753,772	113.73	2.2	1.4 - 53.6	1.4 - 53.6

1 Appliance & 1 Automotive

Liters Oil Equivalent

1 Appliance & 1 Automotive
Liters Oil Equivalent

Table 4 Potential Energy Savings on BEU Recommended
Energy Conservation Measures

Industrial Sector	No. of Company Audited	Combined		Annual Energy Savings Potential		Range of Savings
		Annual Energy Consumption Million KJ	Million LOE	Million Sectoral Savings Million KJ	Million LOE	
1. Cement	4	10,245,899	245.12	59,766	1.43	0.7 - 0.8
2. Ceramics	4	496,227	11.87	65,144	1.56	4.2 - 26.2
3. Chemicals	4	3,854,633	92.22	43,295	1.04	2.5 - 3.8
4. Coconut/Veg. Oil	6	2,266,011	54.21	96,474	2.31	3.3 - 13.3
5. Construction	2	221,390	5.30	28,902	0.69	14.0
6. Food	7	2,016,628	48.24	121,913	2.92	2.5 - 12.4
7. Glass	3	1,705,120	40.79	80,034	1.91	1.0 - 6.5
8. Mining	7	48,032,545	1149.10	741,342	17.74	0.1 - 18.9
9. Petroleum	2	12,908,589	308.82	330,848	7.92	2.3 - 3.2
10. Pulp & Paper	3	13,196,861	315.71	202,533	4.85	1.5 - 3.4
11. Rubber	3	756,664	18.10	54,492	1.30	4.3 - 31.2
12. Steel/Metal	5	10,162,843	243.13	115,377	2.76	6.8 - 19.6
13. Sugar	4	5,198,653	124.37	433,160	10.36	1.1 - 39.2
14. Textile	5	1,889,580	45.21	36,527	0.87	0.7 - 3.9
15. Wood	2	1,113,829	26.65	75,060	1.79	12.7
16. Tobacco	1	70,547	1.69	7,960	0.19	11.3
17. Others	2	123,149	2.95	7,607	0.18	3.0 - 6.9
18. Power Plants	5	93,245,902	2230.76	1,699,217	40.65	1.0 - 8.8
TOTAL	69	207,505,070	4964.24	4,199,646	100.47	0.1 - 39.2

Table 5 PETROLEUM PRODUCTS CONSUMPTION BY INDUSTRY
(In Thousand Barrels)

	1980	Percent of Total	1981	Percent of Total	1982	Percent of Total	First Half 1983
Cement	3,362	6.3	3,030	6.1	3,186	6.6	1,271
Mining	4,244	7.9	3,788	7.6	3,248	6.7	1,413
Textile Mills	940	1.7	859	1.7	754	1.5	402
Transport 1/	<u>4,532</u>	<u>8.5</u>	<u>4,240</u>	<u>8.4</u>	<u>4,592</u>	<u>9.5</u>	<u>2,413</u>
Land Transport	1,548	2.9	1,622	3.2	1,942	4.0	1,053
Domestic Marine	2,076	3.9	1,817	3.6	1,872	3.9	914
Domestic Aviation	908	1.7	801	1.6	778	1.6	446
Steel/Metal/Nickel Processing	5,305	9.9	4,524	9.1	2,894	6.0	649
Other Sectors	35,240	65.7	33,496	67.1	33,937	69.7	20,937
(Including RP & I.) 2/							
TOTAL 3/	53,623	100.0	49,939	100.0	48,494	100.0	27,065

1/ Excludes direct purchases from service stations

2/ Refinery fuel & Loss

3/ Reflects sales to direct consumers only

Steel/Metal Processing Sector

1. Improved instrumentation on boiler
2. Improvement in performance of slab and billet furnaces
3. Reduction in power thru improvement in operations such as standardized stopping and starting procedures of equipment
4. Reduction in fuel oil consumption thru improvement in operating practices
5. Reduction in coke breeze consumption by maintaining high bed height operation, controlled moisture content of mix, etc.
6. Continuous strand casting
7. Installation of a small boiler to accommodate demand fluctuation.

In general, the BEU recommended the following energy conservation measures to the companies audited to attain the identified energy saving opportunities depending on each company's equipment and process:

1. Boiler/Furnace/Power plant efficiency improvement
2. Waste Heat Recovery
3. Condensate/Flash Steam Recovery
4. Equipment Modification
5. Process improvement and improved operating practices
6. Installation/use of more energy efficient equipment
7. Re-insulation Program
8. Improvement of electric power utilization
9. Power Factor Improvement
10. Housekeeping Measures
11. Minimize Rejection Rate

4.0 Major Problems Facing Implementation of Energy Conservation Programmes and Projects

Some of the problems confronting the industry in implementing energy conservation programs are presented below. These could be generally classified into a) lack of energy consciousness on the part of management and employees; b) financial and technical difficulties; and c) lack of supportive government policies.

The most common problems shared by the industries are as follows:

- a. Lack of management support for capital intensive energy projects.
- b. Non-compliance of employees on energy measures
- c. Lack of viable financing
- d. High interest expense and foreign exchange exposure
- e. Lack of viable fuel/blend in the market.

On a sectoral basis, the following problems were emphasized:

Cement: Lack of trained staff on coal utilization. This was realized in view of the on-going coal conversion program by cement firms.

Mining: Difficulty in obtaining water right for mini-hydro systems which some mining firms are considering in view of the localized nature of their operation (lack of NPC Power in the area) and availability of hydro power source.

Steel: Lack of technical support for new ideas.

Textile: Absence of full time energy manager. This stemmed from the fact that B.P. 73 provides only for the appointment of a regular or permanent employee to act as full time energy manager and does not oblige the company to hire another employee as energy manager. Hence in most cases,

the production engineer or engineering manager is normally designated to perform as energy manager aside from his regular functions. In most instances, however, the overriding focus is on the regular workload and energy management is oftentimes accorded a low priority.

Transport: Lack of better road condition. The inferior condition of roads as well as road repairs, diggings performed by utility companies, disrupting normal traffic flow was viewed by the transport sector as a major setback in the fuel efficiency of their operations.

5.0 Proposals/Recommendations

In order to counter the problems and constraints previously identified and thus strengthen the complimentary energy conservation efforts of both government and private sectors, a number of proposals were laid out. Among the proposed measures, commonly cited by the industries are as follows:

- a. Provision of adequate and attractive financing package/ assistance for enercon projects.
- b. Legislation of measures to allow direct power connection with NPC by industries above a specific demand load regardless of location.
- c. Provide tax credits on enercon savings.
- d. Professionalize energy management and mandatory employment of a full time energy manager.
- e. Training of managers and rank and file employees on energy conservation.

These proposals call for appropriate government policies particularly on financing aspects to ensure economic viability of enercon projects and also for accelerated enercon campaign.

Other proposals which are equally important to note include:

- a. Establishment of closer cooperations/interactions among industry members on enercon matters.
- b. Deferment of 3% Ad Valorem Tax and pre tax payment
- c. Amendment of dollar L/C allocation
- d. Strict implementation of traffic rules and rules on road repairs.



Distr.
LIMITED
ID/WG.417/8
29 February 1984
ENGLISH

United Nations Industrial Development Organization

Expert Group Meeting on Exchange of
Experiences on Energy Conservation
in Small and Medium Industries for
ASEAN Countries

Kuala Lumpur, Malaysia, 5-7 December 1983

REPORT*

* This document has been reproduced without formal editing.

INTRODUCTION

1. The Expert Group Meeting on Exchange of Experiences on Energy Conservation in Small and Medium Industries for ASEAN countries was convened on 5th - 7th December, 1983 in Kuala Lumpur, Malaysia.
2. This Meeting was jointly organised by the Ministry of Energy, Telecommunications and Posts, Malaysia, The United Nations Industrial Development Organisation (UNIDO) and the National Electricity Board of Malaysia.
3. The Meeting was attended by delegates from Indonesia, Singapore, Philippines, Thailand and Malaysia. The Energy Conservation Experts from Japan and UNIDO representatives were also in attendance. The list of delegates appear as Annex I.
4. The Meeting was officially opened by the Honourable Deputy Minister of Energy, Telecommunications and Posts, Malaysia, Datuk Haji Suhaimi bin Datuk Haji Kamaruddin. In his concluding remarks he stated that all ASEAN countries had already implemented various energy conservation measures with varying degrees of commitment and had attained varying degrees of success. The time was now ripe for all to reconcile individual efforts and concentrate collective resources under the ambit of ASEAN cooperation. This meeting should provide the platform to discuss and elaborate on the framework of this cooperation in the traditional spirit of ASEAN cooperation and cordiality.

ELECTION OF CHAIRMAN AND RAPORTEURS

5. **Mr. Syed Mohd. Adlan** was elected Chairman of the meeting. The meeting also elected officials from the Ministry of Energy, Telecommunications and Posts, Malaysia to act as the rapporteurs.

ADOPTION OF AGENDA

6. The Meeting adopted the Agenda which appears as Annex II.

PRESENTATION AND DISCUSSION ON COUNTRY PAPERS

PHILIPPINES

The country representative presented his country paper and in his concluding remarks made some proposals towards further ASEAN Cooperation in Energy as follows:-

1. The formation of an Energy Management Association in each member ASEAN country.
2. Formation of an Association of ASEAN Energy Management with the objective of strengthening ASEAN Cooperation on Energy Conservation. This Association could undertake the following activities:-
 - a) publication of a monthly/quarterly newsletter to serve as a medium of exchange of information among ASEAN members on energy conservation experiences, new technologies, problems and proposals for improvement, recent developments etc.

- b) to hold annual seminar/meeting/workshop pertaining to ASEAN energy issues with complimentary exhibition on new energy management products.

In the discussions that followed, Thailand sought further information on the Energy Management Association of the Philippines. The Philippines representative explained that the Association is a private organisation working closely with the Government. To be a member of the Association, one had to be a graduate of a course in basic energy management conducted by the Bureau of Energy Utilization.

Malaysia inquired on how tax credit was being implemented in the Philippines and was informed that the energy-efficient equipments are manufactured locally and given duty free status.

The representative from Indonesia asked how energy audit has been controlled by the Government, who undertakes the energy audit and whether energy audit had become an effective tool towards energy conservation. The Philippines representative responded that the law required companies consuming more than 2 million litres of fuel to submit plans and report on energy consumption to the Government on a quarterly basis. Energy Audit had been conducted by trained energy managers or members of the Association. Publications explaining the method of conducting Energy Audit are also being circulated.

The Thai delegate commented that generally small and medium sized industries are not aware of the importance of energy conservation. In this regard he asked how such awareness can be created. The representative replied there are awareness campaigns, seminars, education and information dissemination towards enhancing awareness in energy conservation.

The UNIDO representative requested information on activities that would be undertaken by the proposed ASEAN Energy Management Association. The Philippines representative explained that the activities envisaged would be to publish and circulate a newsletter on experiences on energy conservation among the ASEAN member countries and also to jointly organise exhibitions and to conduct technical training.

SINGAPORE

The representative from Singapore presented his country paper on the energy situation, energy conservation policy and the main energy conservation measures that have been implemented. This was followed by a presentation of case studies in energy conservation in an industrial gas manufacturer and in a shipyard.

In regard to the government exempting energy-efficient industries from the 10% income tax, the Malaysian delegate requested to be informed of the basis for measuring the efficiency in energy usage. The representative replied that a number of criteria have been used to evaluate the efficiency of energy usage, amongst which would be investment incurred by the company in introducing new energy conservation equipment in the factory and the amount of energy used per unit of output.

With regard to the Energy Conservation Centre in the Public Utilities Board, a delegate from Malaysia sought information on the financing and management of the Centre as well as the provision of services to private industries in energy auditing. In addition he enquired into the effectiveness of the Centre in providing manpower training. The representative explained that the Energy Conservation Centre in Singapore was in fact an exhibition centre and it was the Energy Conservation Division in the Public Utilities Board which functioned in a manner similar to the Energy Conservation Centre in Japan or the Bureau of Energy Utilisation of the Philippines. The Energy Conservation Centre served as an information centre attempting to put across to the consumers the meaning of energy

conservation, particularly on how to save electricity in homes and work places. On the issue of operation and financing, the representative stated that the Centre is operated, financed and run solely by the Public Utilities Board. The Centre conducted audits on requests and does not charge fees for services provided.

The Indonesian delegate inquired on how the success of the energy conservation training programmes was measured, the kind of energy audits that have been conducted to date and whether there are laws on energy utilisation in Singapore. The representative stated that the government had not made it mandatory for heavy energy consumers to appoint energy managers as in the case of the Philippines. However, all new buildings have to comply with building regulations, for instance the 'Overall Thermal Transfer Value' (OTTV) cannot be greater than a stipulated value which restricts the amount of solar heat gain into the building envelope. There are also guidelines on lighting and air-conditioning design for new buildings.

The representative explained that the effectiveness of the training courses could be measured by the number of successful participants. To date the Energy Conservation Division had organised jointly with the Nanyang Technological Institute two courses at the engineers/managers level and with the Singapore Polytechnic, one course at the technician level. The Centre had decided upon joint organisation of the courses for two reasons, namely to indirectly cultivate consciousness of energy conservation in institutes of higher learning and the other based on the reasoning that a certificate from an institute of higher learning would be more significant than one from the Public Utilities Board.

The representative further added that since the surveys are being conducted free of charge, there have been understandably many requests from all sectors of the economy except for the oil companies who already have their own energy conservation experts. During the survey, the first visit to the factory allowed the engineer from the Centre to have some idea of the process involved in the factory which depended on the product mix and the type of equipment. The second visit involved a technical audit, the procedures of which are similar to the procedures given in the UNIDO "Guidebook" which had been distributed among the participants.

On the enquiry from Indonesia on whether building regulations are compulsory, the representative informed that before a building can be put up or altered, approval from the relevant authorities must be obtained.

The Malaysian delegate commented that most hotels in Singapore use the "key tag system" and inquired on the savings achieved by hotels through having such a system. The representative replied that based on a survey undertaken on hotels, as much as 30% of the energy consumption of hotel rooms could be saved using the "key tag system".

The representative from UNIDO enquired as to the kind of cooperation among ASEAN countries in industrial energy conservation that is envisaged by Singapore in the future. The representative suggested that ASEAN workshops on specific industry groups be organised with the objective of exchange of information as well as to encourage greater cooperation in energy conservation among the ASEAN countries.

THAILAND

Following the presentation by Thailand, a Malaysian delegate raised the question on the short training courses given to plant managers by the Energy Conservation Center of Thailand. The Thai representative stated that basically, it concentrated on teaching the plant managers in using various equipment to carry out simple energy audits by themselves. On completion of these short courses, the plant managers are given a certificate of attendance.

To the question from Singapore as to how the Industrial Finance Corporation of Thailand evaluated potential candidates for loans to upgrade their factory to be more energy-efficient, the representative informed that the criteria used was that the factory had to be energy-intensive, the products would have to be export-orientated and in addition should have good import substitution potentials.

In response to the question by Malaysia on how to create awareness in the Factory Management on the benefits of energy audit, the Thai delegate explained that the Energy Conservation Center sent out monthly newsletters to the factories regarding energy conservation. This Center also published results on actual case studies. Experts from the Center also made frequent visits to factories to introduce simple ways in undertaking energy audits.

On the question from Indonesia on how to determine the potential for savings, the representative informed that it was being done mainly through energy audits and they have undertaken a study financed by the UNDP on the three major energy consuming sectors, namely the transportation, electricity generation and the manufacturing sectors.

Responding to an enquiry from Malaysia on tax incentives in which energy-efficient equipment are only taxed 10% of its CIF value, the Thai delegate explained that a Technical Committee consisting of members from the Government, Industries and Academic sectors were responsible for evaluating and listing the types of equipment that would qualify for this exemption. To a further enquiry from Malaysia on the proposed Industrial Energy Conservation Centre (ICT) the Thai delegate informed the Meeting that Thailand will be setting up the ICT to undertake various schemes and programmes of industrial energy conservation. This Centre will be a non-governmental institution operating under close supervision and guidelines of the National Energy Authority. The government will provide an initial amount of US \$2.0 million for this centre.

The Thai delegate added that the large corporations are expected to contribute financially and technically to the running of ICT. The Thai delegate explained that the ICT should be at least partially self-financed and should not depend wholly on the government.

INDONESIA

The representative from Indonesia presented the country paper. The delegate from Malaysia enquired as to whether there was a machinery responsible for energy conservation in Indonesia and if so, which was the ministry or agency responsible for its administration. The representative from Indonesia replied that there is a committee on energy conservation but there did not exist at this stage a permanent institution responsible for energy conservation.

With regard to the work done in energy conservation by French consultants in Indonesia, Malaysia sought further information on the exact nature of the works and the particular Indonesian agency which engaged them. The representative from Indonesia stated that under technical assistance provided by the French Government, preliminary energy auditing had been conducted in Indonesia.

The purpose was to identify areas of potential energy conservation. It was found that with good house keeping a 5-10% of energy consumption could be reduced while significant efforts could reduce consumption by 30%. The consultants had been engaged by the Department of Mines and Energy, Indonesia. The consultants selected seven companies in the industrial sector and two in the transportation sector.

MALAYSIA

The meeting took note of the papers presented by the Malaysian representative.

The deliberation of the report was conducted in 2 parts. The first part touched on energy conservation in Malaysia, and the second, on the report on the energy survey conducted on small and medium scale industries in Malaysia.

GENERAL DISCUSSION

In winding up the day's discussion, the participants were invited by the Chairman for further comments. In response, the Japanese experts directed a question to the Philippines as to who undertakes the energy audit in Philippines. The Philippine representative informed that energy audit had been normally carried out by the Bureau of Energy Utilization, Energy Management Association of the Philippine and private consulting companies. On the question of types of instrument used in energy audit, the Philippine representative replied that the equipment used are standard instruments from Japan, United Kingdom and United States of America.

As a means towards further ASEAN cooperation, the Philippine expressed willingness to extend assistance to member countries in the field of energy conservation. The representatives from Thailand noted with interest energy conservation measures in buildings as applied in Singapore. He hoped that the experiences could be shared and eventually a similar system could be considered for application in Thailand.

The meeting noted that the experiences of the ASEAN countries could be mutually beneficial. Thought has to be given to evolve a mechanism whereby ASEAN cooperation in this field can be put on a formal footing.

PRESENTATION AND DISCUSSION ON ENERGY CONSERVATION GUIDEBOOK

Following the presentation of the Energy Conservation Guidebook by the Japanese Experts, the delegate from Malaysia commented that during energy audits conducted by the Project Team, in the factories, heat losses in the flue gas from stacks was computed merely by measuring the excess oxygen content. In this respect he inquired as to the reason why the energy survey forms distributed by Thailand incorporated measures for carbon monoxide and carbon dioxide in addition to oxygen, and whether it was necessary to take measurements of gases other than oxygen. The Japanese expert explained that to obtain precise figures for heat loss in the flue gas, measurements of the different gases present would be necessary. However, in order to obtain an estimate of the amount of heat loss, it would suffice to measure either oxygen or carbon dioxide contents. A delegate from Indonesia enquired whether it was possible to break down an energy audit into a primary stage and a detailed stage. The delegate from Thailand responded by informing the meeting that in their own experience, the very first stage was to try and convince top management of factories to study their energy bills and compare their energy costs with those of other similar factories. Further steps of an energy audit would involve checking of furnace, checking of steam leakage and proper insulation.

A Malaysian delegate made the following comments on the contents of the Guidebook:

It is not necessary to have detail description of measuring instruments. A listing of the required instruments would suffice.

More tabulated guidelines, practical pointers and check charts should be included for easy reference for the factory engineers and managers. The Guidebook should elaborate methods of reducing oxygen contents of flue gas for different types of boilers.

The Philippines delegate suggested that a list of traditional instruments that could be used for the measurement of various parameters also be included in the annex of the report.

The representative of Thailand stated that the Guidebook will be very helpful to the engineers and technicians in carrying out energy surveys in the factory.

The representative from UNIDO stated that the Guidebook cannot be expected to be perfect at this stage as it is only the first edition. However the feedback from the readers would be noted and suggestions would be considered in future revision of the Guidebook.

DISCUSSION AND IDENTIFICATION OF APPROPRIATE ENERGY CONSERVATION TECHNOLOGY FOR ASEAN COUNTRIES

Prior to discussion on recommendation of possible ASEAN cooperation programmes, the MITI representative explained on Japan's energy conservation policies and measures.

After discussion of possible ASEAN cooperation programmes the meeting identified three projects which could be further explored by UNIDO. The three projects are on:

- a) ASEAN network on energy management in industries
- b) Training of energy conservation personnel and
- c) Technology transfer on converting techniques of oil-fired plants to gas-fired or coal-fired plants, as detailed in Annex IV.

ACKNOWLEDGEMENT OF THANKS

The Chairman thanked the participants for their contribution to the meeting. The participants thanked the organisers of the meeting and the Ministry of International Trade and Industry, Japan.

ANNEX I

LIST OF PARTICIPANTS

Country/Org.	Name	Designation
INDONESIA	1. Mr. Irzal Neor Chatab	Directorate General of Power Department of Mines & Energy P.O. Box 3043/JKT Phone: 323607
	2. Mr. J.M.P. Ohello	Chief, Sub Director of Metal Transportation and Services, Ministry of Industry Directorate General of Small Industry Jalan Gatot Subroto Kav. 52-53 P.O. Box 3547/JKT Phone: 515509, 515526, 515546 Ext. 2643
	3. Mr. Sjafar B. Sinambela	Staff For Director General of Basic Chemical Industry, Ministry of Industry, Jalan Gatot Subroto Kav. 52-53 P.O. Box 3547/JKT Phone: 515509, 515526, 515546 Ext. 2434
JAPAN	4. Mr. Hidetoshi Hayakawa	Chief of Technology Section, Ministry of International Trade and Industry, Japan 1-3-1 Kasumigaseki Chiyoda-ku, Tokyo Phone: 03-501-9726
	5. Mr. Kenji Kondo	Deputy Director, Ministry of International Trade and Industry, Japan Energy Conservation Division Agency of Natural Resources and Energy, 1-3-1 Kasumigaseki Chiyoda-ku, Tokyo Phone: 03-501-9726

Country/Org.	Name	Designation
	6. Mr. Masataka Eguchi	Guidance Manager, Counterpart of UNIDO, Energy Conservation Center Japan
	7. Mr. Ryoji Takahashi	Adviser, Counterpart of UNIDO, Energy Conservation Center Japan
	8. Mr. Toshio Sugimoto	Manager, Counterpart of UNIDO, Energy Conservation Center Japan
MALAYSIA	9. Mr. Ahmad Faizul Shamsuddin	Research Engineer, Research and Development Department, National Electricity Board of Malaya, Phone: 445566 Ext. 441
	10. Mr. Alizan bin Abdul Manan	Planning Engineer, Ministry of Energy, Telecommunications and Posts, Wisma Damansara, Jalan Semantan, Kuala Lumpur Phone: 946677
	11. Dr. Mohd. Ariff bin Araff	Senior Research Engineer, National Electricity Board of Malaya, Phone: 445566
	12. Dr. Ong Peng Su	Research Engineer, Research and Development Department, National Electricity Board of Malaya, Phone: 445566 Ext. 739
	13. Mr. Syed Md. Adlan	Head Energy Unit, Ministry of Energy, Telecommunications and Posts, Wisma Damansara, Jalan Semantan Kuala Lumpur Phone: 946677
	14. Mr. Yap Mew Sang	Federation of Manufacturers Malaysia

Country/Org.	Name	Designation
PHILIPPINES	15. Mr. Gregonio S. Gonzales, Jr.	President, Energy Management Association of the Philippines, c/o PNB, Escolta Manila, Phils.
	16. Ms. Marilou M. Calzado	Manager, Productivity & Development Center Development Academy of The Philippines P.O. Box 74, Araneta Center CUBAO, Q.C. Philippines Phone: 6735215
SINGAPORE	17. Mr. Goh Yeow Tin	Division Director, Singapore Manufacturers' Association 1 Maritime Square #02-18 World Trade Centre, Singapore 0409 Phone: 2785211
	18. Mr. Koh Kah Aik	Head, Public Utilities Board Somerset Road, Singapore 0923, Phone: 2358888
THAILAND	19. Mr. Anonda Poshakrishna	Industrial Finance Coporation of Thailand, 1770 New Petchaburi Road, Bangkok, Thailand
	20. Mr. Chakramon Phasukavanich	Industrial Planning Chief Economic Project Division, National Economic and Social Development Board, Bangkok, Thailand
	21. Mr. Tammachart Sirivadhanakul	Deputy Secretary General, National Energy Administration Ministry of Science, Technology and Energy, Rama 1 Road, Bangkok 10500, Thailand
UNIDO	22. Dr. H.W. Pack	Senior Officer, UNIDO, P.O. Box 300, Vienna, Austria.

	Name	Designation
OBSERVERS		
1.	Mr. Abu Bakar bin Ismail	Management Executive PETRONAS Building P.O. Box 2444 No. 136, Jalan Pudu Kuala Lumpur
2.	Mr. Ahmad Nordeen Salleh	Section Head, Gas Development Department, PETRONAS
3.	Mr. Lim Chin Kee	Federation of Manufacturers Malaysia
4.	Dr. Rahim Bidin	Pusat Penyelidikan Piawaian Malaysia, Shah Alam, Selangor
RAPPORTEURS		
1.	Mr. Au Leck Chai	Ministry of Energy, Telecommunication and Posts Phone: 946677
2.	Mr. Chin Shih Loon	Assistant Secretary, Ministry of Energy Telecommunication and Posts. Phone: 946677
3.	Mr. Letchumanan	Ministry of Energy, Telecommunication and Posts. Phone: 946677
4.	Mr. Mohamat Omar	Ministry of Energy, Telecommunication and Posts. Phone: 946677
5.	Ms. Noraini Hashim	Research Officer, Ministry of Energy, Telecommunication and Posts. Phone: 946677

AGENDA

Monday 5th December

- 8.00 a.m. - 9.00 a.m. - Registration of participants at Merlin Hotel
- 9.00 a.m. - 2.00 p.m. - Visit to Marco Shoes Sdn. Bhd., Port Kelang

Tuesday 6th December

- Opening Ceremony
- 8.00 a.m. - 8.30 a.m. - Arrival of Delegates
- 8.30 a.m. - 8.45 a.m. - Arrival of invited guests
- 8.45 a.m. - 9.00 a.m. - Delegates and invited guests take their seats
- 9.00 a.m. -
 - Arrival of the Hon. Deputy Minister of Energy, Telecommunications and Posts, Malaysia Y.B. Datuk Haji Suhaimi bin Datuk Haji Kamaruddin
 - Address by the Representative of UNIDO by Dr. H.W. Pack
 - Address by Representative of Ministry of International Trade and Industry, Japan by Mr. K. Kondo
 - Address by UNDP Resident Representative Mr. Y.Y. Kim
 - Address and official opening by the Hon. Deputy Minister of Energy, Telecommunications and Posts, Malaysia
- 10.00 a.m. - The Hon. Deputy Minister, invited guests, delegates and observers are cordially invited to the exhibition and refreshments corners
- 10.00 a.m. - 10.30 a.m. - Exhibition/Refreshments
- 10.30 a.m. - 10.35 a.m. - Election of Chairman and Rapporteurs
- 10.35 a.m. - 12.45 p.m. - Presentation of Country Papers and Discussion: Philippines, Singapore and Thailand
- 12.45 p.m. - 2.00 p.m. - Lunch
- 2.00 p.m. - 3.30 p.m. - Presentation of Country Papers and Discussion: Indonesia and Malaysia
- 3.30 p.m. - 3.45 p.m. - Refreshments

- 3.45 p.m. - 5.00 p.m. - Group Discussion on Country Papers
- 8.30 p.m. - Dinner hosted by the Hon. Deputy Minister of Energy, Telecommunications and Posts, Malaysia (at the Lotus Room, Merlin)

Wednesday 21h December

- 9.00 a.m. - 10.30 a.m. - Presentation and Discussion of Energy Conservation Guidebook
- 10.30 a.m. - 10.45 a.m. - Refreshments
- 10.45 a.m. - 12.45 p.m. - Presentation and Discussion of Energy Conservation Guidebook
- 12.45 p.m. - 2.00 p.m. - Lunch
- 2.00 p.m. - 3.30 p.m. - Discussion and Identification of Appropriate Energy Conservation Technology for ASEAN Countries
- 3.30 p.m. - 3.45 p.m. - Refreshments
- 3.45 p.m. - 5.00 p.m. - Consideration and adoption of draft report

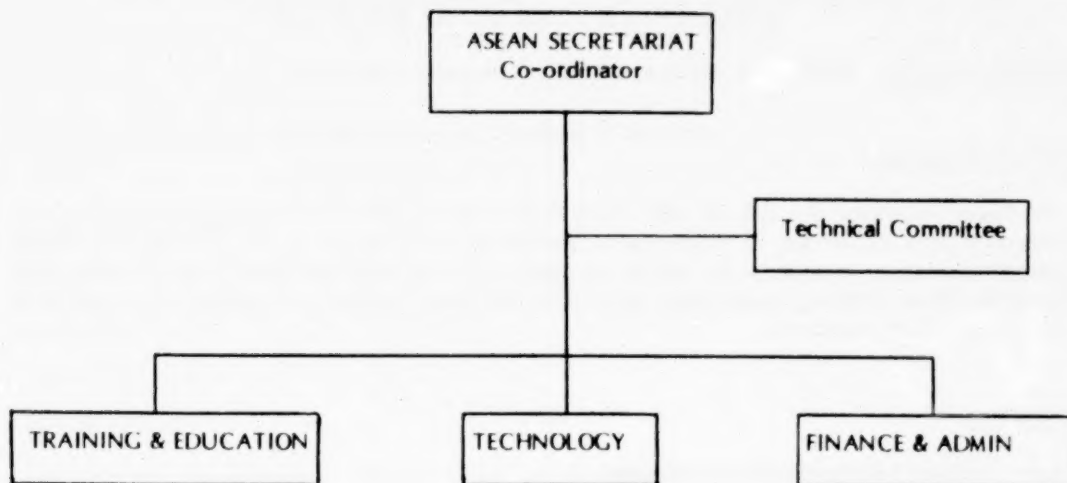
ANNEX III

LIST OF DOCUMENTS

1. Aide - Memoire
2. Energy Conservation in The Philippines (ID/WG.417/7)
3. Energy Conservation in Singapore (ID/WG.417/3)
4. Energy Conservation in Thailand (ID/WG.417/1)
5. Industrial Energy Conservation Policies and Measures: A case of Thailand (ID/WG.417/2)
6. Energy Conservation in Thai Industries (ID/WG.417/4)
7. Energy Conservation in Indonesia (ID/WG.417/6)
8. Energy Conservation in Malaysia (ID/WG.417/5)
9. Guide Book for the Factory Engineers on Energy Conservation Diagnosis (UNIDO/IS .449)
10. Report on the Meeting on Energy Conservation in Small and Medium Industries (UNIDO/IS.443)

PROJECT I : ASEAN NETWORK ON ENERGY MANAGEMENT IN INDUSTRY

1. Formation and Appointment of National Focal point
2. Meeting of Heads/Officer-in-Charge of National Focal points
 - a) ASEAN Secretariat Formation
 - b) Formulation of work programmes based on common interests
 - c) Specify - Activities
 - General - 5 years
 - Specific/Initial - 2 years
 - d) Form Committees within ASEAN Secretariat
 - i) Training and Education
 - ii) Technical (T.T./R & D/Advisory)
 - iii) Finance & Administration
 - e) ASEAN Secretariat Functions:
 - Information Centre
 - Newsletter - Editorial Staff
 - Seminars, Workshops
 - Conventions
 - Exhibitions
 - Survey of Country Requirements particularly Technology, R & D, Education and Training etc.



Information Activities

Seminars

New Technologies

Sources of Financing

Workshops

Survey of Technical Requirements

Budget

Plant visits

Technical Assistance Program

Accounting of funds

Advisory Services

Initial Activities

- A. Formation of National Focal Point
- B.
 - 1) Survey of technical requirements of ASEAN members (training, R & D, education, expertise inadequacy)
 - 2) Survey of technical expertise of ASEAN members (Expert Roster)
 - 3) Information Exchange System (Newsletter, etc.)
 - 4) Collation/Matching of 1) and 2) to establish sufficiency/adequacy (outside ASEAN technology or expertise, if inadequate)

PROJECT 2 : TRAINING OF ENERGY CONSERVATION PERSONNEL

Participating countries: Philippines, Singapore, Thailand, Malaysia, Indonesia

Background information:

Since all Asean countries are lack of skilled engineers and technicians on energy conservation at factory-level, it is a good idea to hold regular workshops for trainers which may also accelerate awareness on energy conservation to factory managers. For example the Philippines is already well established in regular training programmes since 1978, we should utilize such opportunity, extending participation to ASEAN members.

Implementation:

- Step 1: select 1 industrial sector each time.
- Step 2: select participants (most probably from Energy Conservation Centres/Associations or professional associations etc.)
- Step 3: formulate training programmes which includes classroom lessons as well as learning through factory-level surveys.
- Step 4: a team consisting of International experts and ASEAN participants, will conduct a survey on selected factories of ASEAN countries in agreed industrial sectors with measuring instruments i.e. primary auditing of energy conservation. Through this exercise, trainers not only learn energy conservation techniques but also can compare different schemes in different countries. At the same time, this exercise will promote awareness on energy conservation to top factory management.

Consequently more efficient techniques will be transferred from Japan or other developed countries to ASEAN countries. When the trainers return home, they inform and brainstorm factory managers on the importance and effectiveness of energy conservation in SMI.

It may be a good idea to include energy policymakers as participants time to time so that they can learn and compare different energy conservation policies and formulate their own energy conservation policies.

- Step 5: ASEAN Newsletter on Energy Conservation.
Since the Philippines is already publishing a regular newsletter at national-level, it may be possible to include ASEAN news on the subject for circulation among ASEAN members.

**PROJECT 3 : TECHNOLOGY TRANSFER ON CONVERTING TECHNIQUES OF THE OIL
FIRED PLANTS TO GAS OR COAL FIRED PLANTS**

Participating countries: Malaysia, Indonesia, Thailand, Philippines.

Background information:

At least 3 countries of ASEAN have so far found large volumes of natural gas and would like to utilize it on industry, possibly replacing oil fired plants with gas fired plants as far as possible, for example iron-plants.

Implementation:

- Step 1: a preliminary survey team which consists of International experts, Malaysian, Indonesian and Thai counterparts, will study and survey the possible area of replacement from existing oil firing to gas firing in industries, assessing technology as well as economic aspects.
- Step 2: the survey team should visit Advanced countries in order to see utilization of gas in industries.
- Step 3: a preparatory meeting for detailed survey.
- Step 4: a detailed study on replacement plan for selected small industries.
- Step 5: implementation.